DETAILED ACTION

Drawings

1. Figures 10-15 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

REASONS FOR ALLOWANCE

2. The following is an examiner's statement of reasons for allowance:

3. The best prior art reviewed by the examiner is Daikin Industries "Energy effective use base technique research and development, development of two-phase expander and compressor for CO2 air-conditioner" 2002 fruition report. Daikin discloses an air conditioner with a compressor, a radiator (listed as "gas cooler" in reference,) an expander, an evaporator, refrigerant piping, a generator, and a voltage converter in the form of an inverter. Daikin does not disclose the use of a current sensor, or any particular control of the voltage converter. There are many types of controls available in the art, such as the control disclosed by Faberman (US 2006/0250114.) Faberman discloses using a controller for a permanent magnet generator, a current sensor, an

AC/DC converter, and controlling the number of revolutions of the generator. However, the reference does not disclose anything to suggest estimating a magnetic pole position or actuating the generator based on an elapsed time from a compressor start. The reference also does not give any suggestion that it would be of any particular use with a heat pump. Another such controller which is used with a heat pump system is disclosed by Matsui (US 2007/0101735.) Matsui discloses a heat pump system with current sensors; a variable speed converter for converting AC power from the generator to DC power, which also controls the revolutions of the generator; and estimating the magnetic pole position based on the sensed current. However, there is no suggestion by Matsui (or by any references obtained) of using the converter to actuate the power generator at a predetermined elapsed time after compressor actuation. Claims 2-5, 8, and 10 are also allowable as they are dependent upon claim 1.

4. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JONATHAN BRADFORD whose telephone number is (571) 270-5199. The examiner can normally be reached on M-F from 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frantz Jules can be reached on (571) 272-6681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JB/

/Sam Chuan C. Yao/
Supervisory Patent Examiner, Art Unit 4111